

## CLXVIII. A NOTE ON THE CALCIUM CONTENT OF CABBAGE.

By STUART JASPER COWELL.

*From the Medical School, St Thomas's Hospital, London.*

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DURING some experiments on the calcium balances of rabbits receiving a small daily allowance of cabbage it was considered advisable to determine the amount of calcium in the leaves taken from different parts of the plant. The variations found were so large that even when as little as 10 g. of cabbage a day were given and the rest of the daily diet contained 150 mg. of calcium, calculations of the balances might be completely fallacious if leaves from one part of the plant were taken for analysis and leaves from a slightly different position in the plant were given to the animals to eat. Sherman [1928] draws a distinction between the calcium content of cabbage, which he gives as 45 mg. per 100 g., and that of cabbage greens, which is given as 106 mg. per 100 g., but none of the food analysis tables in common use seem to mention the extraordinarily high calcium values which may be found in the outermost leaves of the cabbage.

### METHODS.

Cabbages were obtained from Covent Garden Market during the month of June. Samples of the leaf from different parts of the plant were weighed moist and ashed in silica crucibles, the ashing being completed with the aid of  $\text{HNO}_3$ . The white ash was dissolved in dilute  $\text{HCl}$  and the calcium in the solution was estimated by the method of McCrudden [1911]. On one or two occasions this method was checked by the method of Aron [1907], as modified by Plimmer and Page [1913], which consists of weighing the  $\text{CaSO}_4$  precipitated from the filtrate of the ash solution by  $\text{H}_2\text{SO}_4$  and absolute alcohol.

### RESULTS.

From these results it is apparent that as small a daily ration of cabbage as 10 g. may supply anything up to 100 mg. of calcium and there may be a fivefold variation in the calcium contents of leaves from the same plant which are indistinguishable in appearance, as in the last experiment quoted. It has been claimed by Culhane [1927, 1930] and again more recently by Dupré and Semeonoff [1931-32] that feeding cabbage to rabbits raises the concentration of calcium in their serum, while Kapsinow and Underhill [1929] denied

Table I.

Exp. No.	Description of leaf	Calcium: mg. per 100 g. moist leaf
1	Outer dark green leaf	476
	Inner pale green leaf	35
2	Outer dark green leaf	910
	Inner yellowish heart leaf	34
3	Outer dark green leaf	998
	Inner pale green leaf	53
4	Outermost leaf, dark green	708
	Third leaf from outside, pale green	96
	Yellowish white heart leaf	26
5	Outermost leaf, dark green	1058
	Third leaf from outside, dark green	216
	Inner leaf, pale greenish yellow	71
	Heart leaf, yellowish white	32

that cabbage had such an effect. It would seem possible that this discrepancy might be due to considerable variations in the calcium content of the cabbage used by the different observers. Incidentally the outermost leaves of the particular cabbages used for the above estimations are richer sources of calcium than any other common food, with the possible exception of cheese, and though such leaves are discarded by man they are usually preferred by the rabbit.

#### SUMMARY.

The calcium content of the outermost leaves of the cabbage in summer may be from 20 to 30 times as great as that of the inner leaves.

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